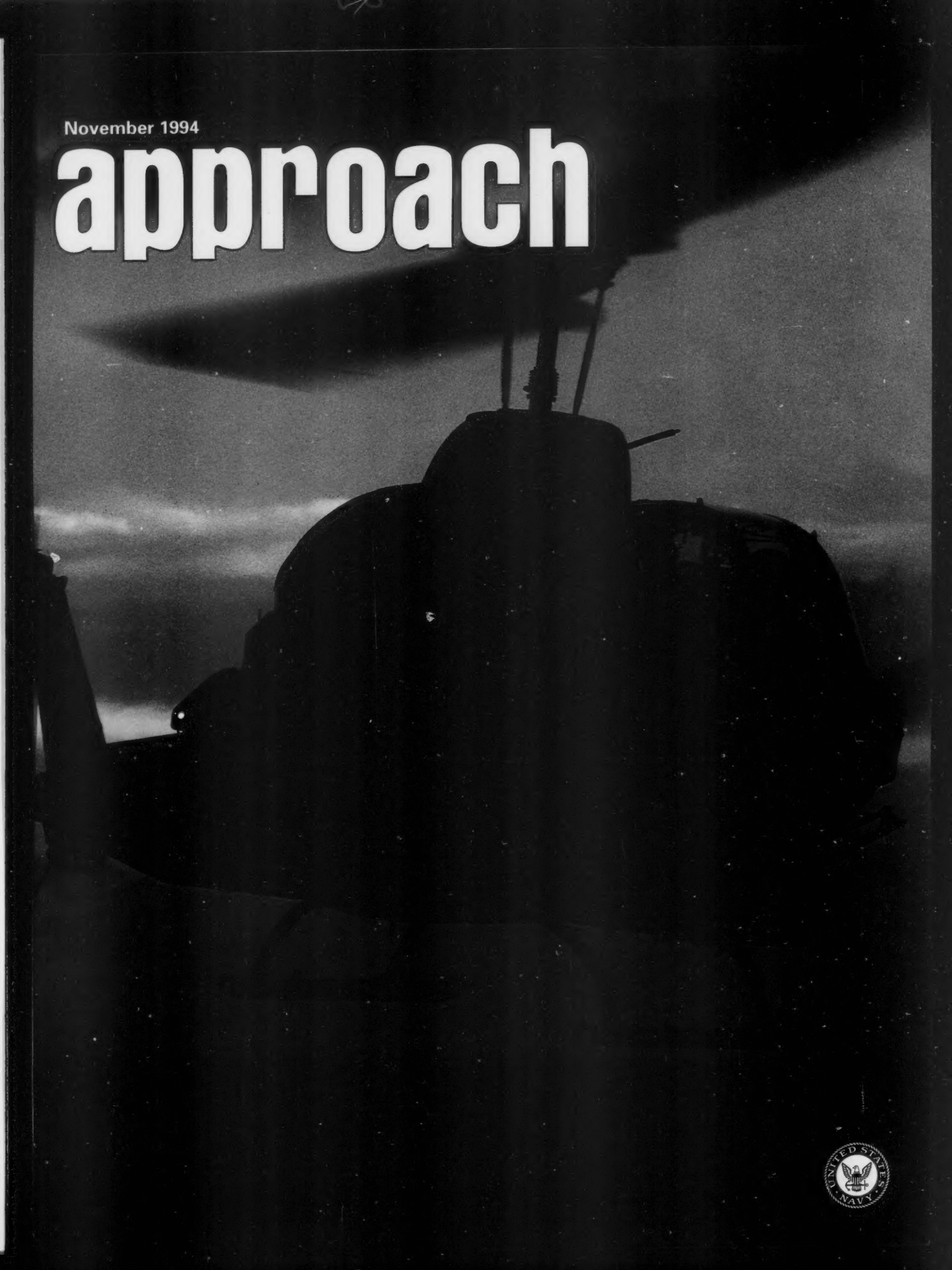
November 1994

approach



GUEST EDITORIAL

PH2 John Bivera

The Flight-Deck Ripple

By Lt. Ruben Garcia

No, It's not a New Age potato chip. It is another way to describe the effects of leadership by example. There are many contributing factors to mishaps, including state of mind, carelessness, goofing-off, forgetfulness, laziness and inexperience. These are all reason *why* mishaps occur, but how do we *prevent* them?

Imagine that you are on the flight deck, manning your F-14D for the 1330 launch. Along with the rest of your shipmates, you have just pulled out of yet another exotic port in the balmy Arabian Gulf. People are tired, hot, dehydrated, and distracted. Sound familiar?

The Air Boss calls, "Start the 'go' aircraft. Start 'em up!"

A couple of minutes pass. You look around and see that several of the people from the flight deck and line crews don't have their chin straps fastened. One man doesn't have his visor down. What do you do?

You must start a ripple effect. Like tossing a stone into a pool of calm water, you simply point to *one* of the forgetful airmen and gesture for him to fasten his chin strap. Of course, this works best when *your* chin strap is fastened. You will certainly see him look around, maybe from sheer embarrassment, to see who else noticed his safety goof. Then, he'll probably gesture to another airman who has made the same error. Ideally, other people will check their straps. It all goes to sharpen everyone's hazard awareness. Remember, just as the ripple in the water eventually diminishes, so does this awareness. Reminders are necessary.

Whether you are the airman on the flight deck signaling to someone else who forgets, or the roving safety officer looking for hazards, we are all responsible for helping everyone in our work place avoid mishaps. The smallest gestures can have great effect down the line.

Drop a stone into the pool and watch the ripple. Lead by example.

Lt. Garcia is assigned to VF-31.

inside approach

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Departments

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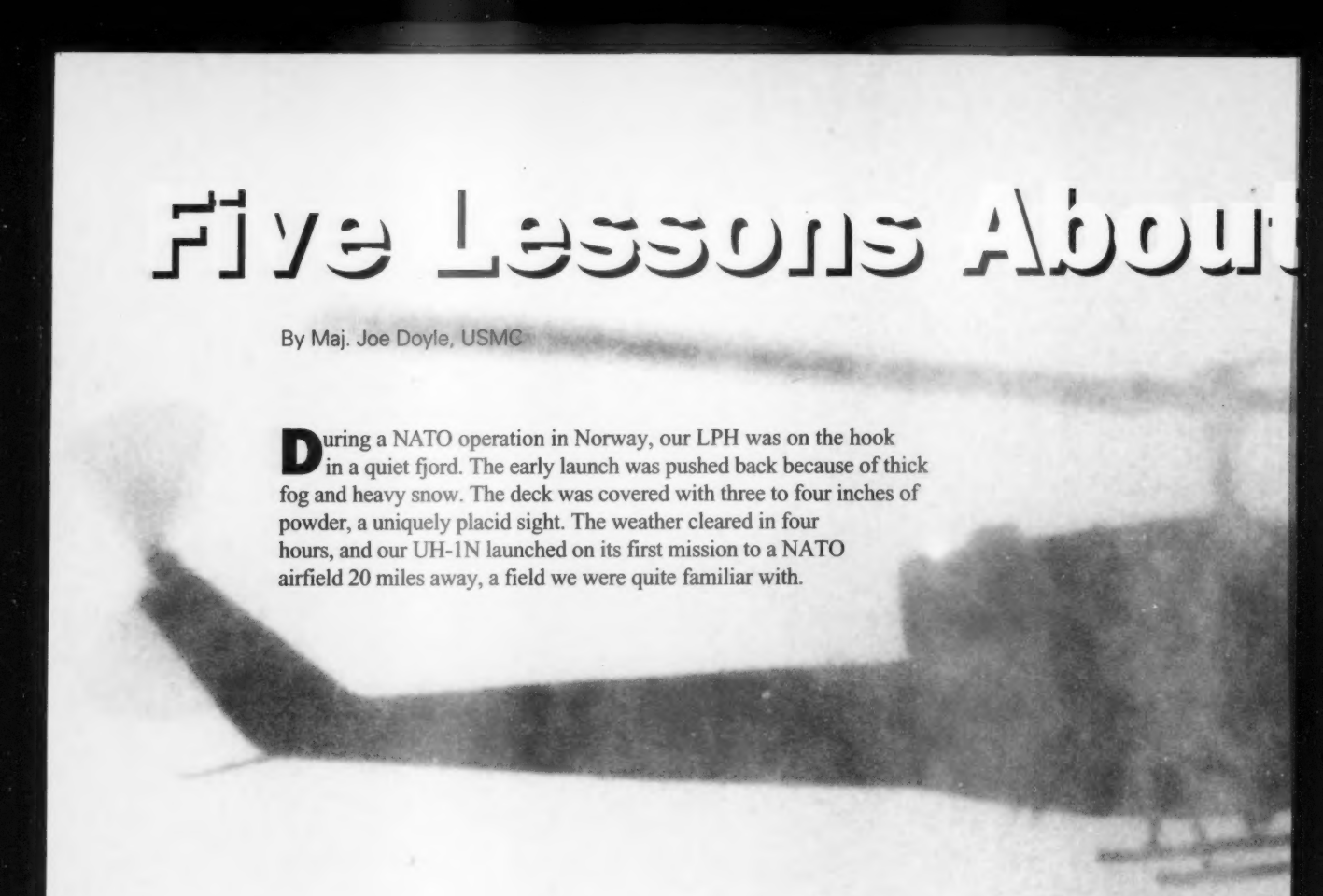
Five Lessons About

By Maj. Joe Doyle, USMC



During a NATO operation in Norway, our LPH was on the hook in a quiet fjord. The early launch was pushed back because of thick fog and heavy snow. The deck was covered with three to four inches of powder, a uniquely placid sight. The weather cleared in four hours, and our UH-1N launched on its first mission to a NATO airfield 20 miles away, a field we were quite familiar with.

En route, we saw snow-covered mountains and waveless water. In spite of some distant snow squalls, the flying was great—exactly why I had wanted to be here. This was our sixth day in the op area, we were accustomed to the cold, and our anti-exposure suits were finally stretching out. By now, all of us had experienced snow and mountain landings. We were enjoying a steep learning curve.

Approaching the airfield at 300 feet, I began considering my approach, taxi, and movement to a spot. I had flown in here several times, and I wondered if the transports had clobbered the ramp and if the snow had been blown off by jet blast.

My first lesson for that day: have a plan. Know where you are going. If not, take it around for a look and *develop* a plan.

On base leg, I formed a good mental picture. There were two transports on deck with at least 500 yards between them, plenty of room. I started a shallow approach to the parallel taxiway, which was next to the field's long ramp. On final, I heard another squadron Huey call, "IP inbound."

My second lesson: pay attention to what is going on around you; it may affect you later. Entering ground effect, I transitioned to a fast taxi, keeping the snow cloud behind the pilot door.

Lesson No. 3: in ground effect, continue with a fast taxi to stay ahead of the snow cloud. Taxiing to the ramp, I picked out a spot near a C-130. I approached the spot at an angle and planned to turn, facing outward so my next takeoff would not require a pedal turn in a snow cloud. Approaching the spot, I started a pedal turn with a slight slide to stay ahead of the cloud. Ninety degrees through this turn, the snow cloud enveloped the aircraft.

Lesson No. 4: with no visual reference, stop! Ideally, all movement should be

Whiteout

stopped before whiteout begins. I was looking down through the chin bubble. All motion stopped; the whiteout was complete. No distant front or side visual reference. I couldn't even figure the height above ground, but I knew I was in a steady hover prior to whiteout.

My options were to set it down or wait it out. Experience had proven the whiteout would last three to seven seconds, then a ground reference would appear—a bush, a rock, or clump of grass. In this case, it was the crusty snow under the blowing powder. No problem. The cloud dissipated, distant trees again appeared in front, and to the right, a snow-covered C-130 crew shaking their fists. Then an easy touchdown, but the story isn't over yet.

As old pilots know and young pilots soon discover, just because you're safe and happy doesn't mean something won't come up and hit you in the back of the head.

Lesson No. 5: stay alert and look around for potential danger. I rolled the throttles down and prepared for shutdown. Then Dash 2 appeared on a right base. I assumed he would land and taxi up next to us. I rolled the throttles back up and waited. We watched their normal approach to a hover while an instant snow cloud surrounded them. The aircraft began to taxi but not fast enough to get ahead of the cloud. The cloud's leading edge was at the helo's nose, leaving just enough visibility to taxi.

If I lifted off, I would hit his rotors. If he set down he would land in mine. He kept coming...

As they approached, my brain was clicking, and I could see a possible scenario for disaster. My hand dropped to the radio. Approaching a spot a safe distance away, they began a 180-degree pedal turn. Boom! They were now completely in the whiteout. I could barely see them only 150 feet away. The 180-degree turn was good, but they had started a right drift toward us. I could see it coming and was ready. I clicked the mike and called a warning. No response. He kept coming. I called and called, "Wave off, wave off!" I couldn't believe it. Next would come the sound of striking metal and then ...

In a split second, I knew there was nothing I could do. If I lifted off, I would hit his rotors. If he set down, he would land in mine. He kept coming.

I had watched this situation develop, stayed mentally ahead of it, but here Iwas, helpless with no control, about to become a number. I was furious. What could I have done differently to stay out of this situation?

He continued to slowly lift above us as he called, "Waving off." He flew out of the cloud and down the ramp. It was over. "That was close," I muttered.

Final lesson: if you're lost in a snow cloud, wave off.

Manuals and SOPs provide standardization, but actual techniques are either self-taught or demonstrated by experienced pilots. Take the extra time, preferably in the brief, to review details of a maneuver before doing it.

Maj. Doyle has served in VT-2, HMLA-369, and HMLA-269. He is currently assigned to USACOM in the regional plans and policy division.

Sideways on a Runway!
or Hydroplaning

There I was, having just completed the IUT syllabus to become an instructor in the Thunder Guppy. I figured my four-plus years of fleet experience and 2,100 flight hours would only make me a better pilot and instructor to fledgling aviators. An afternoon flight changed my mind and hair color in a short but intense 1.9 hours. On a training mission, things quickly went from routine to "I can't believe this is happening to me."

We were on an instrument-training hop (my student's first in the T-2) that culminated in a turn in holding and a high-TACAN approach to a full stop. After about one hour of point-to-points, we entered holding for the TACAN approach. We received and copied the current ATIS (15SCT and visibility 5), then pushed on time.

As expected, we hit the first layer at 14,000 feet but hadn't broken out by the time we leveled off at 1,200 feet (IAF altitude). Still not worried about the weather or our fuel (we started the approach with 2,300 pounds), we continued inbound for the approach.

During the student's brief on missed approach procedures, I had covered what we would request in the event we actually went missed approach, which was a PAR full stop. Well, guess what? The weather guys were wrong, again. On the TACAN approach, we took it down to four miles and 500 feet (still IMC). Then we were informed that we needed to break off the approach. Tower had changed duty runways.

The controller asked if we wanted to pick up a PAR to the new runway, which we quickly jumped on. We continued to fly the approach to the active runway, broke out (about 250 feet), and lined the aircraft up for what I assumed would be an uneventful landing. Wrong again. After touchdown, I raised the flaps to half for better braking action. We started hydroplaning before we got to the shortfield gear. We started drifting to the left and cocking into the wind (to the right).

My eager student, trying to improve his flight grades, was doing just what he had been taught in ground school: calling out the airspeeds; our students are taught to give the instructors airspeeds for every board until we are below 50 knots. After the third call at 90 knots, he asked, "Why aren't we slowing down?" I told him to "look outside" at the runway, not just at the boards. It never dawned on him that we were hydroplaning. Things got real quiet in the back seat.

I added military power, stomped in a boot-full of left rudder to get the nose pointed down the runway, and hoped for quick acceleration before we slid off the runway. We did get enough speed, and with the nose of the aircraft pointing into the wind and still sliding to the left, I yanked the beast off the ground and started flying again. What a relief to be back in the air again, under control... sort of.

We did the missed approach and complied with our previous instructions for

By Capt. Tim Dally, USMC

Made Easy, the T-2 Way

entering the PAR pattern. I got on the radio to let Approach know about the weather we encountered and asked them to relay all the info to station weather and tower. Our weather report included heavy rain, dark ominous clouds, moderate turbulence, and standing water on the runway, standard fall weather for the region.

My student and I started discussing our options. I quickly deduced that we had enough fuel for two attempts at landing before we declared an emergency and diverted to an AFB to the south (where the weather wasn't much better, just different). Halfway through the approach and still on downwind, Tower changed duty runways again. No big deal, they could shoot us straight west from where we were and it wouldn't prolong the agony too much.

ATC vectored us farther south so that we were now on an extended base leg for the PAR. Still not too concerned, we pressed on. As we were lining up on centerline at 19 miles, we heard that Tower had changed runways *again*. I asked what the new duty was and was told to stand by. Stand by? In a jet burning 2,400 pounds per hour? Right.

On final at 10 miles for the duty runway, we were informed the duty had not been changed; the duty was correct the first time. This time, common sense prevailed, and we simply continued straight ahead.

Seven miles out on runway centerline, dirty, waiting to hit the glidepath—you guessed it—another runway change, this time to the north runway. After the first new vector and 12 miles later, ATC let us know the duty was really the south runway. Someone in the tower must have been dyslexic.

At this point I declared minimum fuel and requested a full stop on the south runway, with arrested landing. The weather hadn't changed that much, and after a short discussion with

JOCS Kirby Harrison

my student, we decided that if we didn't make it in on this pass, we would declare an emergency and head to the AFB. What's next?

Let's ask Approach for the AFB's weather. WOXSOF! It figures. Closest field was now 90 miles away and civilian to boot. Having your student get out the PCL to figure out no-kidding bingos, max-endurance profiles, and range profiles is a lot harder than it seems. Nonetheless, I decided to continue with this approach and try not to goon it up.

Finally lined up for a runway south PAR, things were starting to look better. I could actually see ground in spots, and the beating rain showers had started to let up a little. The winds were ferocious out of the west. The final controller (dry, warm, relaxed and, I might add, on the ground) was not as concerned with everything as we were. We received a gross amount of calls to "turn right, drifting left..." I was flying one of the best GCAs of my life, and this guy was telling me to "turn right, going further left of course..."

The final controller, unable to compensate for the high winds, was overridden by a different controller telling me, "Too far left for safe approach. If the field is not in sight, execute a missed approach."

Nothing was in sight. As I advanced the throttles to military, we broke out and I could see part of the airfield. Too far left, of course. The south runway was about 500 yards off to our right. I told the controller that I had the field in sight and was turning downwind to try to put this thing on the deck. He said that we were not cleared to do that, the tower did not have us in sight, and that we needed to make a missed approach (current weather was 200/1). Yeah, right. Maybe in another lifetime, but not now.

I told the controller that I could keep the ground in sight, we didn't have the gas for a waveoff, and that we were turning downwind to the tower and switching. "Good day," I said.

I asked my backseater to switch to tower and let me know when the controller was there. Before I finished my request, he told me we were up tower's freq. I told Tower that we were missed approach and were on a visual downwind for landing.

"Any chance of getting runway west (because of the crosswinds), full stop, via an arrested landing?" I asked.

"Negative runway west" Tower came back, "the gear is fouled with a T-2 right now." How and when did he get there? Well, we continued for landing on runway south.

As we rolled into the groove at 200 feet, we reviewed the landing checks again just to be sure. Full flaps, hook down, a couple of hundred feet short of the gear, on centerline, flare a little to help plant the hook (just a little flare because of the winds), stand by for an abrupt stop. There goes the short-field gear. Maybe we'd get slow, and we wouldn't need the long-field gear. Just great, hydroplaning again.

Full right rudder, half flaps, no brakes, getting ready for MRT. Then I saw a spot that looked dry in front of our airplane. We hit the spot, I hit the brakes hard, and we slowed down. We hit the grooved asphalt, and that helped, too.

Then I saw a spot that looked dry in front of our airplane.

Finally, off the duty and breathing again, we received clearance back to our line. Post-landing checks? Got about half of them (we were slightly rattled). I never tried to raise the hook handle on deck, as it turned out, never needed to. Damn hook never came down. Lessons learned? Many.

Don't underestimate or overestimate your backseater's capabilities. This was my student's first emergency, and he was not quite ready for it. However, asked to do something, he was very quick. Teach the use of PCLs to all students earlier in their flying careers, not just where to find the EPs. Our crew coordination was excellent, one way.

Take a trap if you have standing water reported on the runway, regardless of type of aircraft. Preflight the tailhook (current wing SOP requires tailhook checks only for aircraft going to the boat. We do not want to ruin the concrete pad the aircraft sits on). If you do not want gray hair in your aviation career, don't fly, because even the most routine of hops can suddenly get wild. ◄

Capt. Dally was with VT-86 at the time of this incident. He flew OV-10s with VMO-1, and is currently assigned to VMAT-203 for transition to the AV-8B.

Major DeHart Flies Off the Chart, or HMLA—R?

By Maj. Peyton DeHart, USMCR

The HMLA (Marine Light Attack Helicopter Squadron) concept is as much a blending of two missions—light assault support and attack—as it is a combining of two airframes (UH-1 and AH-1) into one squadron. Having lived through the process of "compositing" many times, it was only mildly surprising to me that I would add refueling to the list of things my aircraft has been called upon to do.

On a two-plane coast-to-coast ferry flight, I found myself in the middle of Texas, about to fly off the boundary of my chart. It wasn't because I hadn't planned before departure. I had picked up every sectional that covered 100 miles north and south of my course line. I had even picked up additional charts, courtesy of some Air Force operations offices. Though carrying an acre of paper, I couldn't outchart a gigantic frontal system that was pushing us south.

Standing in a civilian FBO, paying for fuel with the government credit card, I looked at their collection of sectionals.

"I might need that one due south of here if I get blown in that direction," I thought. "As it is, I'm flying on the margin of the sectional I do have."

However, the FBO wouldn't accept the government card for that purchase. It would either be my cash, my credit card or my doing without. Being cheap, I chose option three. Launching beneath the low overcast, we got beyond the point of no return before the weather closed down and squeezed us off the map. Further flight was pointless, as the destination wasn't serviced by an instrument approach. We set down on an old abandoned airfield we had spotted a few miles down the road.

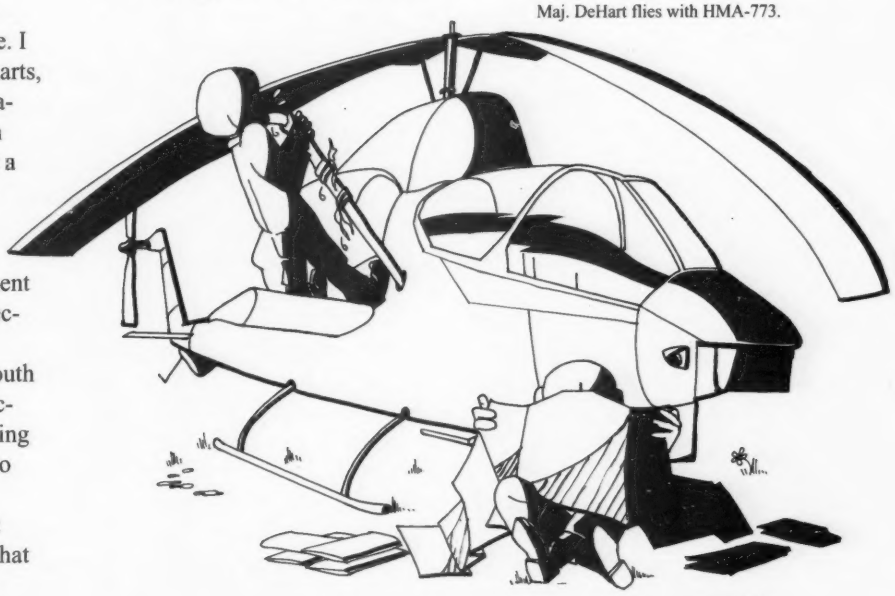
Once safely on the deck, we assessed our situation: neither aircraft had enough fuel to go back, and avoiding the storm had taken us too far off track to make our original destination. There was another place farther south where we could get gas, but we couldn't make it and land with our required fuel reserve. What to do?

First, we stopped for the night so that the storm could pass over us. The next day, we drained fuel from one Cobra into the other and launched the one that had been gassed. When it returned topped-off, we drained some fuel from it to put back into the other aircraft. The weather had cleared, and we continued our flight—back onto my map and back to home base.

Would I have still been weathered-in if I had had the proper charts of the area? Perhaps. Was I dumb not to fork over my own money for a map? Definitely!

It doesn't pay to be cheap when flying expensive machines. If I try refueling from a Cobra again, it will be after it's modified with a probe and drogue. ◄

Maj. DeHart flies with HMA-773.



Peter Mersky

It would either be my cash, my credit card or my doing without. Being cheap, I...

One Second,

By Maj. Douglas A. Jones, USMC

During countless ejection briefs, I heard that the decision to eject has to be made long before you strap in. If you think like I *used* to, you're saying "That's ridiculous, the decision to eject is real time; it can't be predetermined without all the facts".

A few years back (when Phantoms still roamed the skies), I was an instructor in the FRS with about 2,000 hours in type. I thought I knew it all and had seen everything. Early one December morning I was scheduled for the zero-dark-thirty brief. The mission was an intercept hop, flying with a replacement aircrew pilot who had less than 10 hours in the Phantom. We checked the weather out the window. It was clear and a million. Our detailed brief emphasized rendezvous and formation procedures.

Before we walked, a broken layer from 2,000 to 4,000 feet rolled in over the field. Our working area was still clear, so I briefed that we would remain in radar trail until clear of the broken layer then effect the rendezvous. Since the layer only extended a few miles beyond the field, I also told him to remain below it until we were clear.

In the hold-short, I once again went through my pre-takeoff ritual of "assuming the position." Back straight, chin up (look at the wet compass located at the top of the canopy bow), feet back, both hands on the lower ejection handle (I was too tall for the face curtain), elbows in, and a tight body position. I was told (and I believed) that proper body position was key to retaining all your body parts during an ejection. I practiced it before every takeoff.

The takeoff went as briefed, with us winding up a mile and a half in radar trail. Next came a couple of comm calls I had to make on our pre-paleozoic radio, which required me to "bury my head" to change frequencies. When I glanced up, I realized we were IMC (so much for staying below the layer). I told my pilot to keep climbing to get us above the layer and to come right, as I now noticed our lead drifting right on the scope (the direction of our working area).

Shortly after turning my attention back to the radios, I got that "seat of the pants" feeling that we were no longer climbing. A quick glance at my instruments confirmed that we had leveled off at 4,000 feet (still IMC). I also saw that our lead was now drifting even farther right on our radar.

"Keep it climbing, and let's come right," I said over the ICS.

One Miserable Second

At this point, most folks wonder what was the problem with my pilot. He wasn't flying radar trail, he wasn't climbing, and worse, he wasn't complying with his instructor's brief. But I, on the other hand, being a seasoned veteran of flying with inexperienced aviators, interpreted (incorrectly, as it turned out) his lack of response as being simply overwhelmed. After all, he had less than 10 hours in a relatively new jet and was flying in the dark and in the goo, which would put any mere mortal behind the power curve.

It's important to understand that as an FRS instructor, I'd seen this movie many times before. A student becomes task saturated or so focused on a particular event, the first thing he tunes out is his trusty RIO.

Once again, I tried completing the frequency change when that something-isn't-right feeling took over again. This time I saw that we were 15 degrees left-wing down and 5 degrees nose low. I realized at this point that my pilot was not simply overwhelmed. For whatever reason, we were now in a nose-low, left roll. Reverting to unusual-attitude recovery procedures, I called, "Roll right" to level out. I planned to call, "Pull" to bring the nose up through the horizon.

In three to five seconds, with no response from my pilot (either verbally or by flight-control input), our roll continued to an attitude of 135 degrees AOB and 60 degrees nose low. In that time, I made three "roll right" calls, each progressively louder, with the last being at the top of my lungs. We had passed 3,000 MSL (2,800 AGL) and were accelerating through 450 KIAS—less than eight miles from the departure end of the runway.

Looking back, I was surprised to find that my decision to go had already been made. Without any thought but the fact that I was leaving a perfectly good jet, I assumed the position and pulled the handle. In the split-second from pull to rocket-motor fire, while looking at the wet compass, I realized we were now in the clear as I could see street lights directly below me. I figured this would be a short ride.

Many aircrew who eject experience time compression, but not me. Before I knew it, I was in the wind blast, getting the ultimate adrenalin burst. As I tumbled through space, I began to think I had a chance of getting a chute before hitting the ground. If RIOs have nine lives, I used eight that morning. I experienced opening shock and ground impact almost simultaneously (so much for IROK). My chute was draped over what was left of my ejection seat.

As I lay on the ground trying to gather my senses, I realized I was mighty close to the smoking hole that was once a flying machine. With more than 16,000 pounds of JP-4 fueling it, the fire lit up the sky. With that and secondary explosions sending Phantom parts to and fro, I decided it would be prudent to move along.

If I had only pulled that handle one second sooner...

I tried to find my pilot but realized with a 0.75-second ejection sequence differential between the back and front seat he had not been so lucky. If I had only pulled that handle one second sooner, perhaps I could tell you what he was thinking. Maybe not.

The Aircraft Mishap Board (AMB) theorized that he might have suffered a stroke. Another possibility was he became spatially disoriented, saw a streetlight through the broken layer, thought it was lead, and tried to rendezvous. Vertigo may have been a factor if he never looked at or believed his instruments—or his RIO. Nobody will ever know. One second. One miserable second.

During the course of the investigation, the AMB put several instructor and RAC pilots in the F-4 simulator at the same altitude, attitude and airspeed as I was at ejection. With no prior knowledge of these parameters, they were told to recover the aircraft. Most of the instructors were able to, but only a few RACs could do likewise.

So was my decision to eject timely? Was it even correct? Should I have gone earlier, even though the aircraft was still recoverable? According to NATOPS, I was out of the ejection envelope. Anyone can second-guess my decision. The point is, it was my decision. And although I had never played this specific scenario through my mind, I had decided to eject long before this flight.

I had thought out many scenarios involving an inexperienced pilot in an out-of-control situation, who didn't respond or incorrectly responded to control inputs. It had taken several lectures from many old salts who had been there before, but I had fortunately understood the point they were trying to make.

To those new to the occupation and those who have become complacent, here are a few pointers.

You don't have to be told to eject to eject. Be prepared for unusual circumstances by making up your own scenarios.

Life is short. Fly hard, but fly smart. Knowing when to go is part of flying smart.

Make the decision to go now. It's your life, and it's worth more than your aircraft.

Know how to go when it's time to go. Practice assuming the position. Although I broke my hand when I hit the ground, my flail injuries were minimal because I had proper body position when I went out. ◀

Maj. Jones was with VMFAT-101 at the time of this story. He is now an instructor with VT-86.

My A-4 Glider

By LCdr. Tom Page

It was my third ACM hop of the day on a fleet-support det. As Dash 2 of a division, my job was to join up, shut up, hang on, and kill remove when told to. After an expeditious rendezvous and cross-under, I was surprised and amused to see that my flight lead did not yet have me in sight.

After patiently waiting in parade position, I slid up on his starboard abeam position, hoping to catch his eye. A glance showed Dash 3 and Dash 4 with some impressive closure that would either lead to a hot joinup or a colorful underrun.

My amusement at being a stealth wingman suddenly changed. I saw a planform as lead turned into me. I had never seen the topside of an F-16 from 10 feet, and I reacted. As I rolled back upright, I saw the three-plane formation fly away, and I felt very fortunate that I had reacted correctly and avoided a midair.

As I pushed the throttle ahead to catch up, I became aware of silence in my cockpit. I saw the rpm winding down below 60 percent. Don't tell me...I must have shut the engine down when I pulled the throttle to idle. At 1,000 feet AGL and 230 knots, I quickly reseated the throttle to idle and assessed the situation as less than ideal.

I couldn't believe what was happening as I waited for a relight, which was interrupted by the generator kicking off line and the rpm rolling below 50 percent.

I deployed the RAT and started airstart procedures with the throttle back to off, then to idle, followed by waiting. NATOPS says that a normal relight at 250 knots takes about 30 seconds for JP-4 and 45 seconds for JP-5.

With the altimeter at 800 feet AGL and the aircraft slowing to 200 knots, I decided that dumping the nose to pick up 250 knots wouldn't buy me anything except a shorter walk back to the flightline.

I remembered an old trick from my Sergrad days and shoved my index finger into the throttle quadrant and started working the igniters in the hopes of speeding up the relight process. Time compression took over and I began a quick 20-degree jog to the left to avoid the buildings ahead of me.

Passing 500 feet AGL, I was growing angry that I would look like a chump for planting a perfectly good Skyhawk. My anger turned to relief as the rpm began rising. I firewalled the throttle to mil, reveling in the sweet sound of a P-8 spooling up. I bottomed out at 300 feet, and called my lead before heading home. ➤

LCdr. Page flew with Topgun and is currently flying with VFC-13.

The day of my much-anticipated first HAC flight had finally arrived. I would fly with a cruise-experienced copilot on a night FAM flight. The night hop was my fourth one that week.

My first HAC brief was extensive, covering EPs, simulated emergencies, and our anticipated mission of GCAs and night pad work. A thorough review of the ADB, complete with signing the A-sheet (a first!), and my crew was off to the fuel pits for a hotseat. Everything was going right. Even the fuel guy was at the pits on time. I was definitely on a roll.

The turnover from the previous HAC revealed a couple minor discrepancies, one being the left seat's cyclic ICS was intermittent.

"That shouldn't be a problem," I thought. "I can always use the ICS foot switch or go 'hot mike'."

A review of the checklist, a call to Ground for taxi clearance and away we went.

About an hour later, having completed our instrument work, we proceeded to the pads for some FAM work. During the GCAs, I had found my cyclic ICS switch required a lot of finesse to operate, taking two, sometimes three tries to work. With this in mind, we kept comms to the essentials.

We started our pad work, shooting normal and steep approaches. These went well and I decided to make some approaches with the automatic stabilization equipment

Why Does Marge Simpson Wear Her Hair Like That?

By Lt. Rob Hardegen

(ASE) off. After shooting several ASE-off approaches, I swapped control with my copilot, who made an ASE-off approach to the pads.

Rolling final, we were a little high and fast.

"No problem," I thought, "he'll start bleeding off airspeed any time now."

We continued the approach and did start to slow down, but we had also stopped descending.

I keyed the ICS and said, "High." Nothing. More jiggling of the cyclic switch didn't produce any better results. I stayed calm. We were still within steep-slope descent parameters and besides, this was a cruise-experienced pilot, right?

My rate-of-descent call at 80 feet received no response. A quick scan of the gauges revealed power was coming in, the rate of descent was slowed, and as I scanned outside, I noticed we were...spinning! Another quick scan of the gauges showed us passing through 225 degrees of turn and in a climb. It looked like a case of uncommanded right yaw.

Being the good (albeit new) HAC, I tried to take control of the aircraft. That annoying ICS switch made things interesting. My "I have the controls" ICS call got no response. Neither did another call. As I continued to wrestle with the cyclic, I called over the UHF circuit "I have the controls." My copilot countered with, "No, I have it."

Trying to sound calm, I said," *No*, I have control," and forced the collective down to stop the climb and got our heading under control. I tried to sound professional with the waveoff call to Tower and settled into a rather quiet trip around the pattern. We landed, swapped controls and my copilot shot another approach. This one was also high and fast, but he called Tower for the waveoff.

"Good headwork," I thought. I then thought back to our spin over the pad two minutes earlier. Did we turn 225 degrees or 585 degrees? Why did we start to spin? Why does Marge Simpson wear her hair like that? While I was thinking these lofty thoughts, my copilot shot another high and fast approach and commented he was waving off because his tail rotor control pedals were "sticking."

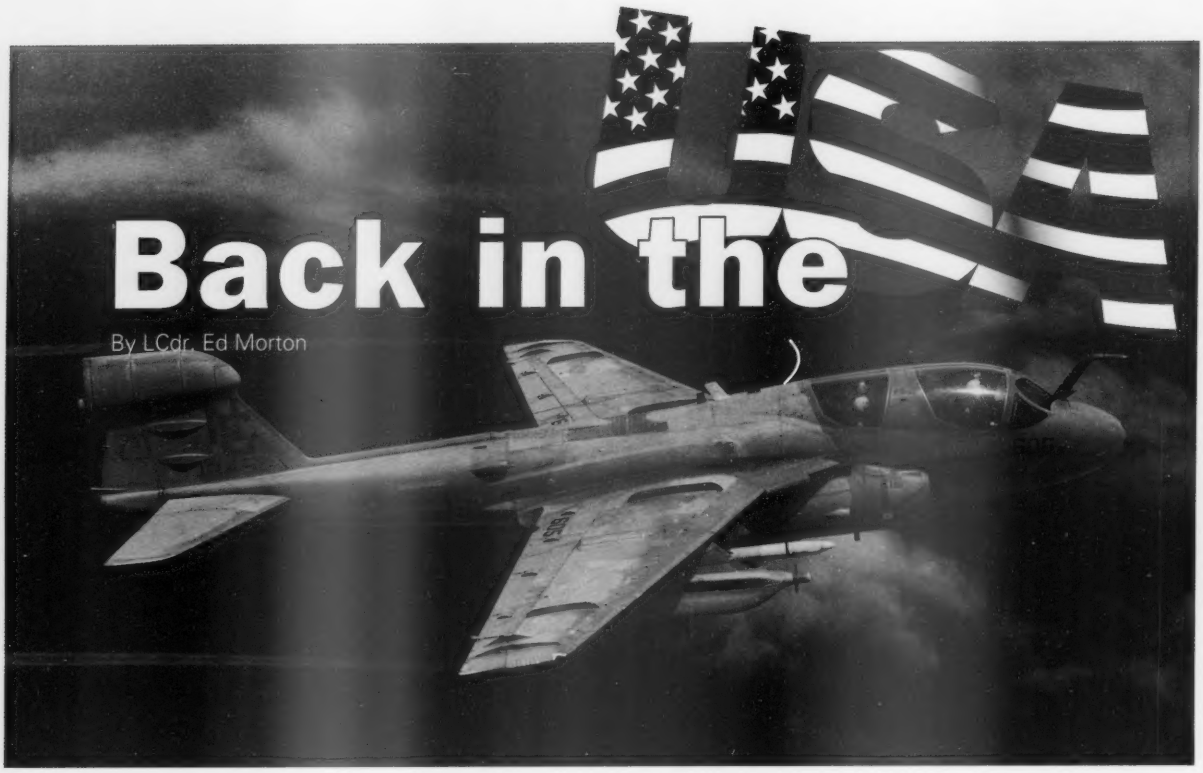
I took control of the aircraft and made two approaches. I didn't notice anything other than my cyclic ICS becoming increasingly temperamental.

By this time, that warm and fuzzy feeling all naval aviators cherish was gone. Did I want to troubleshoot a possible tail-rotor problem at night with a faulty ICS and a copilot who was not having a good flight? The little voice inside my head said, "Enough is enough. Time to go home." The short flight back was uneventful, and maintenance was very helpful in writing up the discrepancy.

When is "enough" really enough? For me, it wasn't with a faulty ICS system. Nor was being placed in a low, spinning hover that could have been beyond my ability to recover.

Was I lucky? You bet. I had all the ingredients for a classic aircrew-coordination story: a new, anxious HAC, a dark night, and mechanical problems. Fortunately, this story had a happy ending.

Lt. Hardegen flies with HSL-37.



Back in the

By LCdr. Ed Morton

An out and in. A good deal since we would fly a Prowler on a low level defensive-maneuvering flight. We also had a chance for our backseaters to sharpen their somewhat rusty operating skills, following a two-month layoff after returning from Desert Storm.

We launched and canceled our IFR plan. We entered the low-level route, which would spit us out at the northern edge of NAS Fallon's airspace. The route was forecast to be sprinkled with scattered cloud layers on the way, but overall, the weatherguesser didn't think we would have any problems staying VMC along the route. After the second turn point, it became obvious things had changed.

As we left the mountains and entered the high-desert plateau, a monster wall of virga (rain that never hits the ground) lay ahead. We quickly realized that we wouldn't be able to penetrate it without going IFR. My pilot and I had the sense not to push the rules, and we began a spiral VFR climb to 16,500 feet.

After a minor helmet fire while correlating our position from a VFR TPC low-level chart onto a low-altitude airways chart, we managed to contact the appropriate center controller and get an IFR clearance to Fallon.

We had a reserved EW range time and the weather there was usually better than average. With any luck, we'd still get some EW training out of the way for monthly requirements.

Following our IFR pickup, the rest of the flight south on the airways went smoothly. Center handed us off to Approach about 40 miles west of the field. We checked in with our altitude and call sign, and asked for clearance directly to the range. The IFR pop-up from the low level had cost us 10 minutes, and we were in a hurry since our scheduled range time would expire in 20 minutes.

The controller acknowledged our check-in, gave us the local altimeter setting, and told us to expect clearance into the range momentarily. Following our check-in, we could hear the controller talking to another Navy aircraft, which was already on the range, on a discrete frequency.

I'd seen this before: controllers are often given responsibility for both approach and range-control

airspace when activity is light, which seemed to be the case this day. The weather was good, with visibility greater than 20 miles.

About 90 seconds later, just as I was about to pimp the controller for our range clearance, something made my eyes drift right and fixate just below the right side of the aircraft.

Two seconds later, I, my pilot, and the right back-seat ECMO caught a fast (but very large) glimpse of a twin turboprop civil aircraft as it passed directly below our Prowler from right to left, with a vertical separation of less than 100 feet. I could see the pilot of the twin wearing a light green headset, and his airways chart was on his panel. He wore a set of "Ray-bans," and I also saw his head snap up and to the left with as much surprise as mine as he passed directly beneath us.

After a couple of lost heartbeats and deep breaths, we became angry for the lack of heads-up traffic advisory from our controller. About 10 seconds after the near midair, our controller nonchalantly gave us our range clearance, seemingly unconcerned about our recent brush with death. I quickly asked if she had seen the traffic on her radar. She hesitated and then, in a startled tone, replied, "I see him now."

She then apologetically asked if we wanted to file a report. We thought for a few seconds, but decided to be good guys and not get her in trouble. We continued the flight, did our range runs, and landed for fuel before returning to Whidbey.

I went home that night and had trouble falling asleep as I thought about how close we had come to a Class A mishap. My first instincts were to deny our crew's responsibility for the incident and to blame the controller. After all, she wasn't very busy, and as far as we could tell, was only controlling one other aircraft. I had lost quite a lot of confidence in controllers. I had never had a controller blindside me before.

The next morning, I was scheduled for my annual instrument ground school refresher. The radar chief from our home base NAS and a local FAA radar representative gave one of the lectures. I raised my hand and described the previous day's incident, and asked whether I had been wrong in any way. I was surprised to hear from the FAA rep that, much like the old reliable traffic court catch-all charge of "failure to use due caution," I had a responsibility to maintain visual separation from all aircraft whenever VMC existed, despite the fact that I was on an IFR clearance with radar contact. The rep also told me that traffic calls are issued "as available," and could not interfere with normal control duties. I was surprised at my previous misconception of what "radar contact" meant. My trust in the whole IFR system dropped even lower. However, the radar chief was on my side and insisted that I call the radar chief at Fallon to investigate the near-miss.

The Fallon radar chief was cooperative and understanding. He promised that he would look into the matter, review the radar tapes and get back to me.

He called the next afternoon, sounding quite agitated. The radar tapes clearly showed the two aircraft (along with their mode C altitude squawks) on a collision course for more than a minute before the near midair.

The civilian aircraft was climbing VFR, and at the time that the two blips merged, the planes' mode-C codes indicated zero separation. The chief had suddenly become a believer in just how close the miss had been. Apparently, the controller had not seen the VFR traffic when she checked us in.

That afternoon, I let our squadron safety officer in on the story. He was a little upset that I hadn't reported the incident the day it happened and that I hadn't filed a hazard report with Fallon. The next day, we sent out a hazard report message for everyone to learn from the incident.

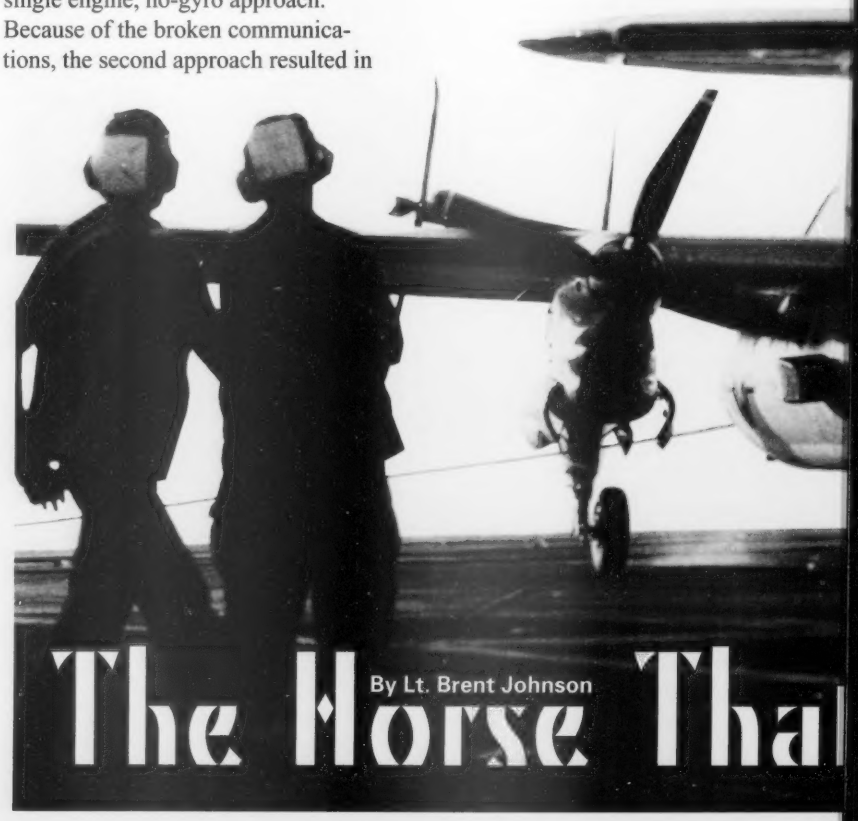
I learned several lessons from this brush with death. Whenever you are VMC, treat the situation with the same vigilance you would on a VFR low level. Be constantly alert for the bugsmashers. Most of us "drive defensively." We should also fly that way.

Don't let the IFR radar environment lull you into a false sense of security. Controllers are human, and they can make mistakes. Keep your scan outside whenever possible, and don't fixate on or just above the horizon. The guy that nails you will be the one in a climb, coming from your blindspot underneath.

At the ship, VFR traffic avoidance becomes a second-nature survival instinct. Once you're off cruise, you can get rusty back in the "safe and comfortable" home sky. Don't let that feeling of being secure sneak up and stab you in the back. ◄

LCdr. Morton flew with VAQ-137. He is currently assigned to VAQ-129.

A controller's priorities for traffic separation are: IFR to IFR, IFR to VFR, and VFR to VFR, with the last two on an "as available" basis.—Ed.



The Horse Tha

By Lt. Brent Johnson

A recent article in *Approach* ["Red Means Stop...and Think," Feb '94] described an E-2C crew's decision not to shut down an engine for a fire light. The article generated a lot of discussion in our ready room and among readers of the magazine. Under discussion was the Hawkeye crew's decision to leave the engine running, in violation of NATOPS, because they had no secondaries and were blue water, at night and in bad weather. As justification, they used the paragraph in the E-2C NATOPS which says that NATOPS is "not a substitute for sound judgement."

In discussions, opponents took the position that NATOPS was written in blood and was not to be violated, even suggesting that the offending statement quoted above be removed from the NATOPS altogether. This idea stimulated good debate, but seemed academic, until an incident in our squadron.

An E-2 launched on an evening flight from NAS Atsugi for a check ride for the NATOPS Instructor Flight Officer in the local op area. The weather was not great, with rain and low clouds, but it was above mins and expected to stay that way.

The mission went as planned, and two hours later, the Hawkeye was on a six-mile PAR final, dirty, in a rain shower, but nicely set up for landing. The starboard engine fire light abruptly illuminated. The engine had no secondaries. Even though the crew suspected a faulty fire-warning system, they went through the NATOPS procedures, cleaned up and shut down the engine.

At this point the situation started to deteriorate. The inertial navigation system dumped as the bus tie was made. Then, the secondary system, HARS, tumbled as well, leaving the aircrew with only a standby gyro for attitude reference. Faced with this multiple set of failures, the crew aborted the approach and went around.

To make matters worse, communications with Approach deteriorated, leaving the aircraft without radio contact for several minutes. The crew discussed diverting, but no better alternative was available. The nearest field had the same weather but no PAR, and the other suitable fields were 400 miles away, a long single-engine divert with no guarantee of better weather at the other end.

After finally regaining communications, the aircrew decided to try a single engine, no-gyro approach. Because of the broken communications, the second approach resulted in a missed approach when the controller couldn't vector the aircraft into a safe position to land.

After a third attempt, the crew successfully broke out in a safe position and made an uneventful field arrestment. An investigation revealed that rainwater had shorted out the fire-warning system, causing faulty readings and some of the communication difficulties.

Let's contrast this situation with the one in the earlier article. Nearly everything is identical—night, bad weather, no realistic divert, and an engine fire light with no secondaries. The crew of the second aircraft had the advantage of being off the beach and were already talking to Approach. If they couldn't recover, they could have abandoned the aircraft near land, or even over land.

Even with these advantages, the crew had a hard time recovering safely and had to wave off single-engine twice.

The first aircrew had none of these advantages. A shipboard recovery at night in bad weather in an E-2C or any aircraft is difficult at best. One of our crews (with two good engines and instruments, but no ACLS, since it is marginally reliable in heavy rain) made four approaches to the ship in a rainstorm one night, and they never even saw the ship. We were blue water with no possible diverts. It was only when the ship cleared the storm that the crew could recover. With only one engine, the first crew may have been unable to recover safely, facing a night, bad weather, open-ocean SAR.

This gets us back to the "sound judgment" issue. NATOPS procedures are written because aircraft systems and experience have determined what we believe to be the best procedures. There is nothing magic about it, as is shown by the number of significant NATOPS changes still occurring, even in our 24-year-old E-2 (among which is the recent mandatory engine shutdown for a fire light). These procedures are designed to give us the best chance of recovering safely, but when the risks of taking a NATOPS action are greater than the risks of *not* taking action, should we still do it? Do the risks of a *potential* engine fire outweigh the *known* risks of a night, bad-weather, single-engine CV approach and the added potential risks of more failures?

As naval aviators, the government spends millions training us to make these decisions. If everything were cut-and-dried, there would be no need for human pilots. Trying to remove the official sanction that NATOPS gives when good judgment dictates a non-NATOPS action is saying that a pilot's judgment cannot be trusted. We are trained and selected for the ability to make hard decisions, and that official option should not be taken away. After all, it's our lives on the line, not a program or a thick blue book. ◀

Lt. Johnson flies with VAW-115.

The author vindicates our original intention: to keep a ready-room discussion going. Lt. Vince Bowhers, an E-2 pilot now assigned to CVW-7, also wrote us recently:

I hate to beat a horse that looks dead, but this one is still breathing. As one of a handful of aircrew who have had an inflight engine fire in the E-2C, I want to add my comments to the original article and the responses it generated.

The aircrew in "Red Means Stop...and Think" weighed the risk of keeping an engine on line with a fire light and no secondaries—an all too common occurrence in the E-2C—versus a single-engine recovery onboard ship on a rainy night with a pitching deck. Let's stop second-guessing the accomplishment and learn something from the experience.

One look at the number of false fire-warning lights in the Hawkeye will show that there is a problem with the fire-detection system that is forcing aircrew to repeatedly take unnecessary risks. It's time that we focused on the root of the problem and not the consequences.

We now bury the horse in a hidden grave far away.—Ed.

Refused to Die

PH1 Michael D.P. Flynn

The pilot had flown into power lines strung across the Tennessee River.

CHUM Isn't for Bait

By Peter Mersky

We tend to take military training routes (MTRs) for granted. These canned itineraries can be conveniently programmed into the daily flight schedule, and usually provide both general and specific mission training. Checkpoints and altitudes test our pilotage skills, and if we have a good hop, we're set for the day. As we get familiar with "our" MTRs, however, we also risk losing our SA and running into—literally—other aircraft or obstructions.

The burden, of course, is not solely on military aviators; everyone who flies should avail themselves of every source of information to plan their flight. Civilian operators should consult latest material in the *Airman's Information Manual* (*AIM*); military crews should check the *Chart Updating Manual* (*CHUM*) and its supplement. These publications give the latest information on newly placed towers, wires and other obstacles that aircraft may encounter during low-level flight.

As military aviators should always plan their low-levels and meticulously adhere to each MTR's requirements for checkpoint entry and exit, so should other pilots be aware of operations along these dedicated portions of airspace.

Recently, an A-6 crew launched on a VR low-level. They were zooming along at nearly 500 knots ground speed and 200 feet AGL, an exciting hop. Suddenly, in less time than it takes to read these words, a civilian crop-duster appeared (*its* estimated speed was a bare 96 knots). The collision that followed took out both aircraft and injured three men.

The collision point was on the MTR's centerline, only nine miles from the final checkpoint. Although a case was made for the A-6 crew's not having been at the required altitude, because of ambiguities in the altitude restrictions of the VR route, fault also lay with the civilian AG-CAT pilot who had not adequately checked the operating range of the MTR. He had blithely flown through what was known to be a hot area. There was enough blame to go around.

"See and avoid" is a nice little buzz phrase, but at a closure of 600 knots, it loses its impact—pun intended.

Midair collisions between military and civilian aircraft continue to plague us. Civilian aircraft, particularly light, recreational aircraft such as ultra-lights and gliders, enjoy a great degree of freedom, much like pleasure boaters. Glider pilots must be licensed, but ultra-light operators do not. Overall, these aircraft have the run of the air. Their domains are noted on various flight charts—symbols for glider parks and parachute drop zones dot sectionals and TPCs with an implied warning to other pilots to avoid these particular places.

There are known areas that experienced flight crews know, such as the Imperial Valley around El Centro, and the slopes and foothills of the Appalachians. But incidents do happen.

An A-7 pilot launched from Miramar on a cross-country back to Lemoore. The low-level promised to be an enjoyable, scenic flight home. As he approached his last checkpoint—a mountain peak with a ranger

tower—he turned left to get on the last leg of the trip. As he rolled out, he found himself heading toward a glider on the other side of the ridge. The civilian was heading straight for the Corsair. Although the glider pilot tried to avoid collision, it was too late.

Fortunately, both aircraft and their pilots survived the collision, with varying degrees of damage to their planes and their egos. The Navy reimbursed the glider pilot for the damage—gliders do have the right of way, even on low-level routes, and even though the low-level was plainly shown on the glider pilot's sectional.

When you're planning for MTRs, account for obstructions on the ground. Power lines and their supporting towers materialize with disconcerting frequency along familiar routes. If you don't know they're there, you could be in for a surprise.

The young pilot of an AV-8B was part of a two-plane training sortie that included low-level navigation and low-altitude tactics (LAT). He had 250 hours in the Harrier; his flight lead was an experienced AV-8 driver.

The hop seemed to go OK, but when the two intrepid Marines returned home, they found that the wingman's aircraft had a damaged wing tip and horizontal stabilizer. Several wing pylons and the Harrier's 25mm-gun housing were also damaged. Pieces of wire also hung from the aircraft.

The glider pilot tried to avoid collision, but it was too late... gliders do have the right of way, even on low-level routes.

The pilot had flown into power lines strung across the Tennessee River. The wire was at 100 feet AGL, 100 feet below what the LAT rules of conduct allowed for this sortie.

The junior pilot and his lead had not adequately reviewed their route. To make matters worse, other marks obscured the wire symbology on the chart. The mishap board said that if the two pilots had paid more attention to highlighting the wires, the wingman would not have been so low, knowing that there were such prominent obstructions in the area. At 420 knots—seven nautical miles a minute—the young pilot might have seen the wires, but he would have had no time to react and avoid them.

Power lines are the specters that constantly haunt aircrews on low-levels. An Intruder crew was enjoying a low-level through a valley in West Virginia when they flew into power lines 432 feet above a valley floor. Fortunately, the lines were thin enough to break as the bomber struck them. The only damage was two gashes on the outboard slat.

The weather was 3,500 feet, scattered, with 30 miles visibility, and the crew was well above the minimum authorized altitude for the leg. SOP was a minimum of 200 feet AGL. They were also on centerline, and had reviewed hazards during their brief. But had they checked everything?

A one-inch tension high-line silhouetted against a blue sky on a day with good visibility can probably be seen more than a mile away. A power line that blends into a background of foliage or rocks may not be seen until it is only a few hundred feet away, much too short for a crew to react. The investigators in the West Virginia mishap found that they couldn't see the wires—even though they *knew* they were there and were expecting to see the wires. Only when they turned and looked back, with the wires against the sky, did they see the hazardous lines.

F-14 aviators are becoming more involved with low-level flight these days. Four Tomcat crews briefed for a low-level navigation mission, with a "civilized" brief time of 0900. The flight lead was a highly experienced pilot with a junior RIO. The crews used CHUM information in the brief.

When Dash 4 had a maintenance delay, the flight launched as a 3-plane. Settling onto checkpoint Kilo, a railroad bridge over a river, Dash 2 reported a birdstrike and climbed off the route. The flight returned home without further problems. A postflight walk-around revealed damage to the canopy, wings and a five-foot piece of static line wrapped around the F-14's nose. Flying at 420 KIAS, the crew had only a second to recognize and react to the obstacle—clearly an impossible time requirement.

We don't often talk about non-aircrew aspects of the mission, but here's a case where a mishap might have been avoided by an up-to-date chart library. The CHUM and TPCs the crew used were just barely out-of-date, but enough so that the new static lines weren't on the charts they had. Intel officers, take note! ◄

I'll Trade Three SDOs for a Flashlight

By Lt. Jeff Thompson

Recently on a routine night training mission, I dropped a small flashlight in the aircraft. I searched for it as best as I could short of unstrapping from the ejection seat. I told the other crewmember that I had dropped the light so he could note it for the debrief.

After we recovered, I forgot to search for the light and went to Maintenance Control to debrief and complete the paperwork. Then, I remembered the light. I told the maintenance chief and night check flight-deck chief. The night-check chief commented that he was returning to the flight deck and would make sure the matter was resolved. The aircraft was subsequently downed for FOD in the cockpit and was annotated on the daily status report. I did not write a MAF since I thought that the situation would be taken care of immediately. Little did I know that this wasn't to be the case.

The following day, the same aircraft was turned for an alert with nothing unusual reported. Later that same evening, the aircraft was scheduled for another mission. Preflight and start-up were normal, but the pilot noticed that the flight controls were binding when he checked them. The aircraft was downed.

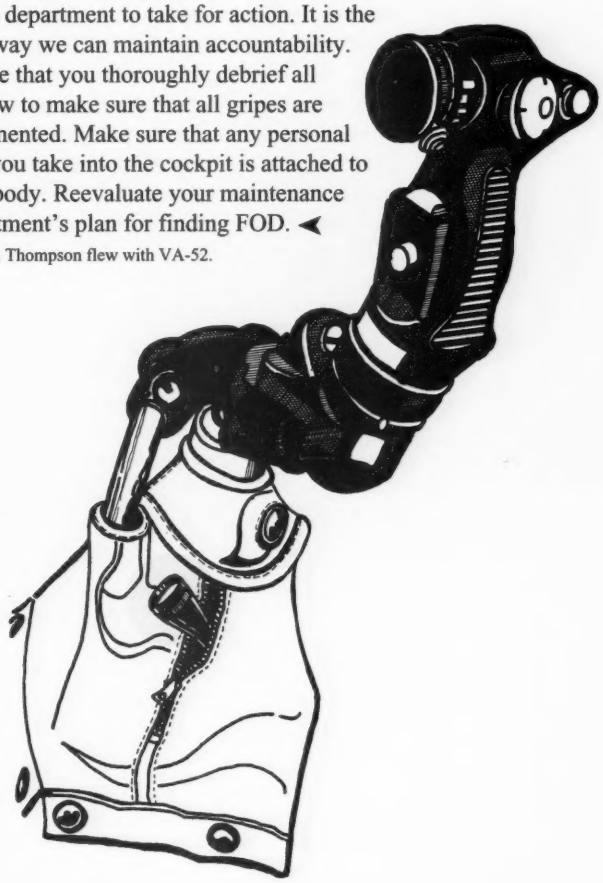
When a mech removed the FOD-prevention boot at the base of the stick, he found the flashlight, lodged in the flight controls. The skipper was understandably upset at needlessly losing a sortie (it was his hop), and gave me a few no-fly days to think about the incident and find out why it happened.

On investigating as to why the FOD hadn't been located when it was reported, the night-check chief replied that no one could find the light. Since I hadn't documented the FOD, he assumed that I had found the light. Fortunately, the FOD was located before a launch.

The situation was an example of what can happen when we assume without communicating. I should have documented the FOD, and not assumed that it would be found immediately. The chief should not have assumed that I had found the light just because he couldn't locate it. We also assume that the FOD boot served its purpose. In this case, it didn't, but it's hard to imagine why not.

Document anything you wish the maintenance department to take for action. It is the only way we can maintain accountability. Ensure that you thoroughly debrief all aircrew to make sure that all gripes are documented. Make sure that any personal gear you take into the cockpit is attached to your body. Reevaluate your maintenance department's plan for finding FOD. ◀

Lt. Thompson flew with VA-52.



We normally do not associate "pulling Gs" with helicopters

Moments From Disaster

By Maj. R.E. Joslin, USMC

This article originally appeared in the January 1989 issue of Approach. *A recent Class A mishap in a sister service and several close calls in the Navy and Marine Corps have highlighted the need to put this information out again.—Ed.*

In 1981, a Marine UH-1N was lost, and one aircrewman was killed on an EVM sortie when the aircrew found themselves in an unarrestable rate of descent.

Following a left pop-up to gain advantage over the second Huey, the pilot found himself in a descending turn, with 70-80 percent torque, and an airspeed of 80-90 knots. Thinking he was in a settling-with-power condition, he froze the collective and tried to fly out of the condition by lowering the aircraft nose to increase airspeed. The helo hit the ground, with the left rear skid sustaining the initial shock and breaking free. The right skid eventually broke free as well, and the UH-1 slid on its belly straight ahead for 100 feet before beginning a right roll. The main rotor blades struck the ground, and the aircraft became airborne. It traveled 30 feet while rolling 360 degrees, and struck the ground again on the right nose and forward cabin area. It cartwheeled back into the air, then fell back to the ground onto the left cabin roof and engine section.

The PIC unstrapped and helped his copilot away from the aircraft, then returned to help the crewman in the aft cabin. The crew chief, secured by only a gunner's belt, suffered fatal injuries.

Analysis of the mishap revealed that the helo was not settling-with-power, but had merely overbanked and failed to compensate.

We normally do not associate "pulling Gs" with helicopters, and consequently, our lack of understanding of this phenomenon has been a contributing factor in past mishaps. It will be so in the future unless we educate ourselves about exactly what is happening to a helicopter maneuvering at high angles of bank. Other fairly recent mishaps involved helicopters operating at high angles of bank, close to the ground. The pilot at the controls was flying cross-cockpit (flying from the left seat and turning right, or vice versa), resulting in the aircraft descending and hitting the ground. These mishaps were not ACM/EVM-related but reveal that many pilots don't appreciate the aerodynamics of high angle-of-bank flying close to the ground.

Let's look at the dynamics involved, starting from level flight (rotor thrust equals weight), and then rolling into an angle of bank while maintaining constant altitude and airspeed (Figure 1). We know from experience that to maintain this energy state requires an armful of collective. This is because of the increased thrust (manifested as collective position) required to provide anti-weight (vertical) component when the thrust vector is tilted from the vertical upon entering an angle of bank. That is, our apparent weight (G-loading) increases proportionally with the angle of bank when we add sufficient power to maintain flight in a bank without losing altitude or airspeed. To determine G-loading, take the inverse of the cosine of the angle of bank.

Representative angles of bank and their associated G-load are tabulated in Figure 2. Example: If we are in a 60-degree angle of bank, then we are pulling 2 Gs, which essentially means that we weigh twice as much as our straight-and-level gross weight. That is, if we increase our power sufficiently to maintain the same altitude and airspeed, but in an angle of bank.

What happens if we don't have the power available to lift twice our gross weight, or if we don't apply collective immediately upon rolling into a bank? Figure 1 shows that we no longer have an equilibrium of vertical forces, hence we accelerate downward in the direction of the unbalanced force.

For illustrative purposes, let's assume we are flying at 300 feet AGL and roll into a 60-

degree angle of bank while maintaining our airspeed, but without increasing our collective power. How long will it take before we hit the ground? Figure 3 plots the time to impact from various entry altitudes (AGL) and angles of bank, assuming no initial vertical velocity.

Actually, the plotted time to impact corresponds to when the altitude sensing port hits the ground, which obviously will be preceded by main rotor impact. This plot is independent of the type of aircraft or gross weight and is merely a function of angle of bank. Note that a partial application of power or a reduction in airspeed will increase the time to impact and, conversely, power reductions or increases in airspeed will decrease the time to impact. Also, any initial rate of descent present upon entry will decrease the time to impact, while any initial rate of climb will increase the time to impact.

Another factor, not considered, is the increased parasite drag induced because of a change in the area exposed to the free-stream flow when we go from straight-and-level flight to an angle of bank.

For our example, starting at 300 feet AGL and rolling into a 50-degree angle of bank without any power adjustment while maintaining our entry airspeed, the time to impact is approximately six seconds—which is how long it took you to read this sentence!

A moment's hesitation in applying collective or distraction because of radio communication, caution-panel warning light illumination, traffic calls, visual disorientation, or whatever—coupled with a failure to immediately satisfy the power requirements when rolling into an angle of bank at low altitude, will result in a descending turn that puts you just moments from disaster. ◀

Maj. Joslin was the helicopter aerodynamics instructor for the Aviation Safety Programs at the Naval Postgraduate School when he wrote this article. He is currently the department head for the attack-assault branch of the Rotary-Wing Aircraft Test Directorate at NWTC Patuxent.

Part of this article was reprinted from the October 1988 issue of *Flying Safety*.

Figure 1

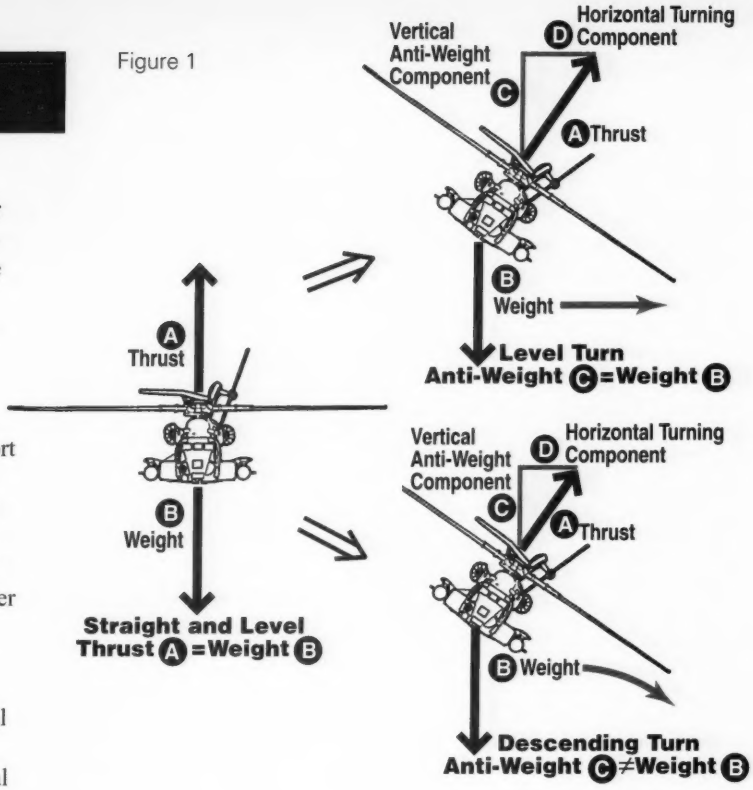
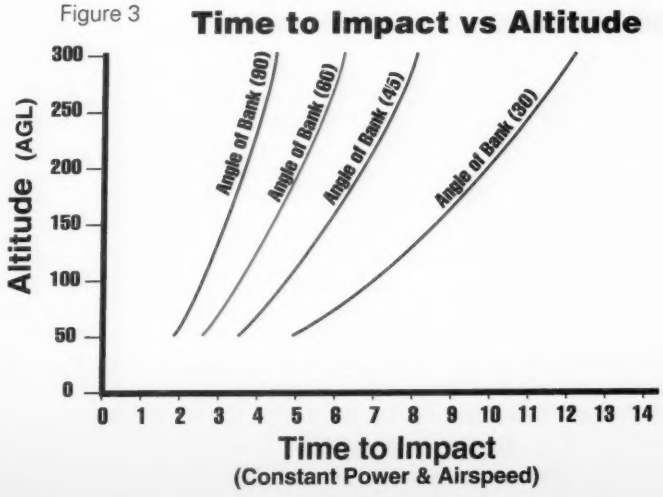


Figure 2

Angle of Bank	★ G Load
0	1
10	1.02
30	1.15
45	1.41
60	2.00
75	3.86
85	11.50
89	58.82
90	∞

★ Apparent weight while maintaining altitude and airspeed at listed angle bank

Figure 3



Bravo Zulu

Left to right: Lt. Cory, AE3 Bowen, AT3 Carazo, Lt. Romero

Lt. Greg Romero
Lt. Steve Cory
AD1 David Hale
AE3 Burt Bowen
AT3 Andres Carazo
HC-6
Lt. Jose Casa
USS *Butte*

USS *Butte* intercepted a distress call from a woman on a sailboat. She was frantically trying to reach the Spanish coast guard. The woman and her male companion had been sailing a 33-foot boat from Spain to South America when they found themselves in a gale-force storm. The man had been washed overboard one hour earlier and the woman did not know anything about sailing or how to use any equipment other than the radio. To make matters worse, she did not speak English.

With the help of the Spanish coast guard, *Butte*, which was sustaining 30-degree rolls, obtained the sailboat's position and plotted an intercept course for a rescue. Once the sailboat was in sight, the American ship launched its rescue helicopter. The woman had received translated instructions from Lt. Casa (damage control assistant), who spoke Spanish, and her global positioning system updates guided the HC-6 Det 8 helo to her position.

The Navy crew told her to abandon the boat, which was pitching and rolling wildly, and to get into the water; this was the only way the rescue crew could get her.

The helicopter crew prepared to make the rescue, lowering AT3 Carazo (rescue swimmer) into the water connected to the external hoist. AE3 Bowen (crew chief) directed Lt. Romero (HAC) into position approximately 50 yards astern of the sailboat.

As AT3 Carazo entered the water, Lt. Cory (copilot) monitored the aircraft's gauges and relayed communications to *Butte*.

In less than 15 seconds after the woman entered the water, she was retrieved by AT3 Carazo and on her way up the hoist into the hovering CH-46D. When she was safely onboard the helicopter, AD1 Hale (second crewman) treated her for shock and hypothermia.

Left to right: Maj. Harvey, Sgt. Alvardo, Capt. Hayes

Maj. John J. Harvey, USMCR
Capt. Rusty E. Hayes, USMCR
SSgt. Keith L. Borrow, USMCR
Sgt. Jorge D. Alvardo, USMCR
MAG-49, Det C

Maj. Harvey (HAC) and Capt. Hayes (copilot) were leading a flight of two UH-1Ns from NAS South Weymouth to MCAGCC, Twenty-nine Palms. Leaving runway 33 at Sioux Falls Airport, and transitioning to air taxi at 10-15 feet and 5 knots, their Huey completely lost tail-rotor thrust when the output-flex coupling for the 42-degree gearbox failed.

Capt. Hayes (PAC) realized that the severe nose tuck and rapid yaw rate were uncommanded. Maj. Harvey, who was involved in switching to ground control, felt the yaw and took control. He knew that the tail-rotor drive had failed. He rolled both throttles to flight idle and executed a "cut gun."

Aircraft yaw from onset to touchdown was about 540 degrees. It occurred in what the wingman estimated to be 3-4 seconds. Although gross weight was 9,200 pounds, aircraft damage was limited to spread landing gear.

After getting parts, the two crew chiefs, SSgt. Borrow and Sgt. Alvardo, helped repair the aircraft in two days. After a check flight, the ferry flight resumed.

Left to right: Cpl. Crane, Sgt. Rahatt, GySgt. Brakhage, Capt. McGowan, Capt. Judkins

Capt. Scott McGowan, USMC
Capt. Jim Judkins, USMC
GySgt. Scott Brakhage, USMC
Sgt. Anthony Rahatt, USMC
Cpl. Mark Crane, USMC

MAWTS-1

At the end of a 2.2-hour training flight, this crew was air-taxing clear of the duty runway with Capt. Judkins at the controls. Their UH-1N suddenly developed a violent vertical beat. Capt. McGowan (IP) took control and called for an immediate slide-on landing. He landed from 10-15 feet AGL and at approximately 30 knots.

Once on deck, the severe vibrations continued to rock the Huey. The crew made an emergency shutdown and left the aircraft after GySgt. Brakhage (ICC) signaled that the way was clear.

Inspection revealed that the tip cap and weights of the white main-rotor blade had fallen off in flight. There was also evidence of the rotor mast hitting the blade stops.

Left to right: Lt. Couch, Lt. Hamel, AW1 Olivo, AW3 Winter

Lt. Kevin Couch
Lt. Quinton Hamel
AW1 Chris Olivo
AW3 John Winter

HS-8

While conducting vertrep during a carrier ammo off-load, the crew of Loosefoot 614 experienced a main-rotor damper failure. Lt. Couch (HAC) had just lifted a 2,200-pound load clear of the flight deck and began a right slide toward the AO alongside when the crew felt a marked increase in airframe vibration. As the vibration increased, Lt. Couch declared an emergency and slid to back to the left to drop the load back onto the flight deck. A second HS-8 helo, which was positioning for a lift, immediately cleared the area.

AW1 Olivo (first crewman) directed the load over the first open space on the deck. Vibrations steadily increased as Lt. Couch maneuvered for the drop. After the load dropped, the vibrations subsided slightly, and the crew prepared for an immediate recovery onboard the carrier.

Vibrations increased again as Lt. Couch maneuvered up the port side to a landing on spot 5. After landing, the aircraft shook so violently that Lt. Hamel (copilot) needed three tries to reach the PCLs and secure the engines. In the short time required to secure the engines, the aircraft moved six feet to the right, and its nose yawed 30 degrees to the left. When the engines were secured, vibrations immediately subsided, and the crew went through the rest of the shutdown.

A main-rotor damper line had ruptured, causing a complete loss of hydraulic fluid from the damper accumulator.

BZs require an endorsement from the nominating squadron's CO *and* the appropriate CAG, wing commander, or MAG commander. In the case of helo dets, the CO of the ship will suffice. A 5-by-7-inch photo of the crew by a squadron aircraft should also accompany the BZ nomination. Please include a squadron telephone number so that we can call with questions.

My F

By Lt. Steve Kane

Spring had arrived in America's finest city, as witnessed by the 1,500-foot marine layer, low visibility and moderate temperatures. Coordinated ASW was the morning's tasking. Sawbuck 702 and 705 would be working with three surface ships and two SH-60Fs against a *Sturgeon*-class SSN.

We briefed lookout doctrine and communications, anticipating a complicated scenario at low altitude with several aircraft. We completed our brief with ASW tactics and overwater-ejection procedures.

We launched, called Departure, then switched to FACSFAC, callsign Beaver. Beaver cleared us direct to the Southern California Offshore ASW Range and gave us permission to switch to the frequency for our air-coordination exercise.

Just as we were going to change frequencies, I heard an aircraft ("Bogey 2"), trying to get a word in edgewise with Beaver. It sounded as if the lead ("Bogey 1") was having engine trouble and declaring an emergency. At this point, the bogies were discussing the problem over Beaver's frequency, and they quickly determined that the pilot of Bogey 1 couldn't stay with the crippled A-4 much longer.

As you might have guessed, our ASW tasking was put on hold as we shifted into a search and rescue mission. We tried to convey our intentions to Beaver—relieve Bogey 2 as SAR on-scene commander since both of our S-3Bs had five hours of fuel,while Bogey 2 was quickly approaching the limit of his endurance. We received two SAR discreets, and the players began checking in: Bogey 2, Sawbuck 702 and 705, Loosefoot 614 (one of the scheduled ASW exercise helos), and a surface ship. When asked if he had his wingman in sight, Bogey 2 replied that he saw a good chute before descending through the overcast layer. Then he lost sight. That made things more interesting. We needed to come up with a search plan quickly since we were just minutes from datum.

It didn't take a Ph.D. in meteorology to deduce that we were not going to be successful unless we descended under the cloud deck. Not a single hole to be found, so the call went to Beaver for an IFR descent to VMC while the radar and FLIR were warming up.

We had just decided on a search plan when 705 called tally-ho—hard to miss the survivor when he's shooting at you with pencil flares.

We assumed on-scene commander as we established an orbit around the survivor (who was in his raft at this point). Although we saw his flares, it was nearly impossible to see the guy in the water even though he was waving his arms and kicking his legs. Small man, big ocean.

We had Mk-58 smokes in our sonobouy chutes. Why not kick out a pair to make it easier for the rescue helo to spot him? We couldn't have asked for better placement:

irst SAR

one 400 yards north, and the other 400 yards south with Bogey 1 directly between them.

Suddenly, there was Bogey 2 flying in to have a look--at our altitude! We had gotten so wrapped up in keeping sight of Bogey 1 that operating attitudes slipped out of our scan. A pair of tight turns and some G got the gears turning again. Sawbucks have 400-800, Bogey 2 has 1,000-1,500, Loosefoot has 300 and below. Bogey 1's position was passed to Loosefoot who was GPS-equipped. Loosefoot reported smokes in sight. Great news; the down side was that we now had an H-46 coming in to assist at the altitude block assigned to the rescue helo.

We requested that the H-46 avoid the area between the smokes. "No problem," the HAC responded, and he volunteered to inspect the area for any wreckage. The next thing we knew, Loosefoot had Bogey 1 onboard and was heading for home plate.

"How's Bogey 1 doing?" I asked.

"Seems to be uninjured and in very good spirits for some reason," Loosefoot replied.

After all the excitement wound down, we were once again off to our original mission, which turned out to be very successful as well.

There are a few lessons I took away from my first SAR mission. Think about what *you* will do on a SAR mission and plan accordingly. Ten minutes out isn't the time to be formulating a search plan.

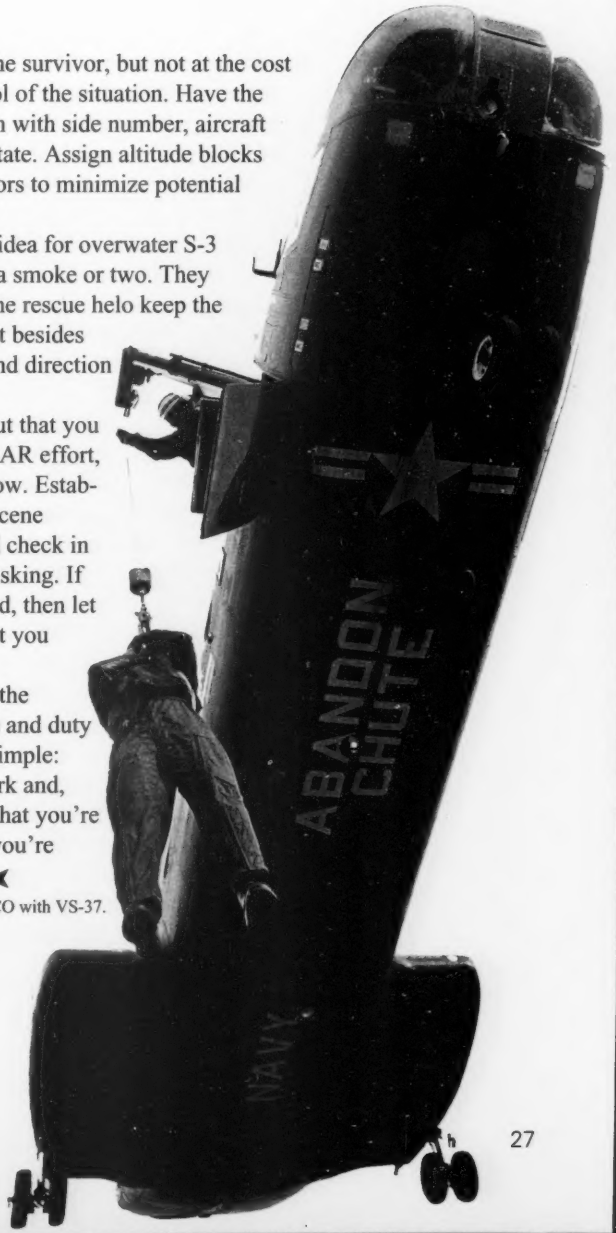
If you're the on-scene commander, don't lose your situational awareness. Your primary task is to find the survivor, but not at the cost of losing control of the situation. Have the players check in with side number, aircraft type, and fuel state. Assign altitude blocks and search sectors to minimize potential conflicts.

It's a good idea for overwater S-3 flights to carry a smoke or two. They helped us and the rescue helo keep the survivor in sight besides determining wind direction and speed.

If it turns out that you can assist in a SAR effort, let someone know. Establish who is on-scene commander and check in with them for tasking. If they're swamped, then let them know what you can do.

Always get the survivor's name and duty station. Why? Simple: SAR is hard work and, you might find that you're "thirsty" when you're back on deck. ◄

Lt. Kane is a TACCO with VS-37.



TCAS v th

By Cdr. Stephen Rose

On an evening flight from Los Angeles to Honolulu, a US airliner had to deviate from its assigned altitude when its Traffic and Collision Avoidance System (TCAS) commanded a series of vertical maneuvers to avoid an approaching aircraft. The flight crew was ordered to climb, then to increase the climb rate, and then to stop its climb and descend. These commands were all based on changing target information from the approaching aircraft. The abrupt maneuvers injured some passengers and tossed serving carts about the aisles.

As the flight crew complied with the command to descend, they saw the lights of an unidentified aircraft (there was no other reported traffic in the area) as it passed closely above them.

Although the identity of the other aircraft was never established, it might have been a Navy aircraft operating from an aircraft carrier steaming in the area.

Most commercial airliners are equipped with TCAS. Military aircraft can activate these systems by flying near an airliner, requiring the airliner to take evasive action. Intercepts of unknown aircraft encroaching upon carrier battlegroups in off-shore warning areas or over the high seas could easily cause a TCAS conflict.

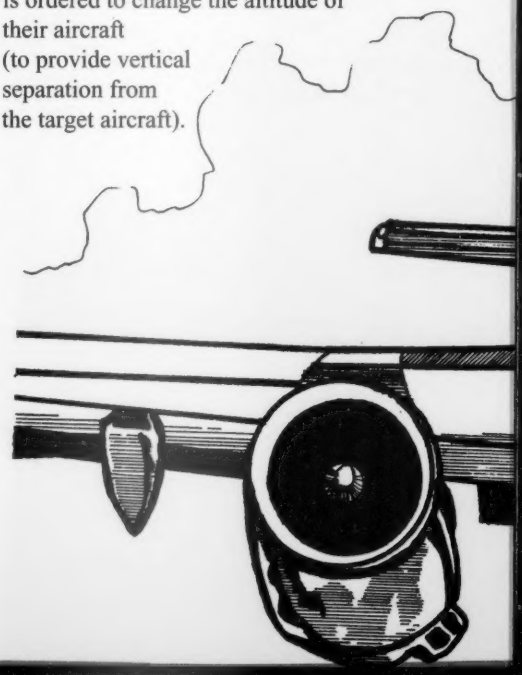
TCAS is installed in airliners, and aircrews could face airliners maneuvering in both the horizontal and vertical planes. Besides the potential for passenger injuries, this unexpected maneuvering could increase the chances for a mid-air.

If you understand how TCAS operates, you can reduce this hazard. TCAS is currently in its second phase (TCAS II) and gives aircrews avoidance commands in the vertical plane. TCAS III, still under development, will also provide horizontal commands. TCAS is activated by transponders when aircraft are squawking either mode "S" or "C." The system is designed to operate out to a maximum range of 14 nautical miles and in traffic densities of up to .3 aircraft per square mile. The system is also designed to provide collision-avoidance protection for closure rates of up to 1,200 knots horizontally and 10,000 feet per minute vertically. The system identifies air traffic in three basic ways:

Tracking. Alerts the crew to all transponder-equipped targets within range of the TCAS equipment.

Traffic Advisory (TA). TCAS has declared the target aircraft an intruder. The crew knows that the vertical separation will be less than 1,200 feet at the closest point of approach (CPA).

Resolution Advisory (RA). TCAS has declared the target aircraft a threat. The crew is ordered to change the altitude of their aircraft (to provide vertical separation from the target aircraft).



e APG-65

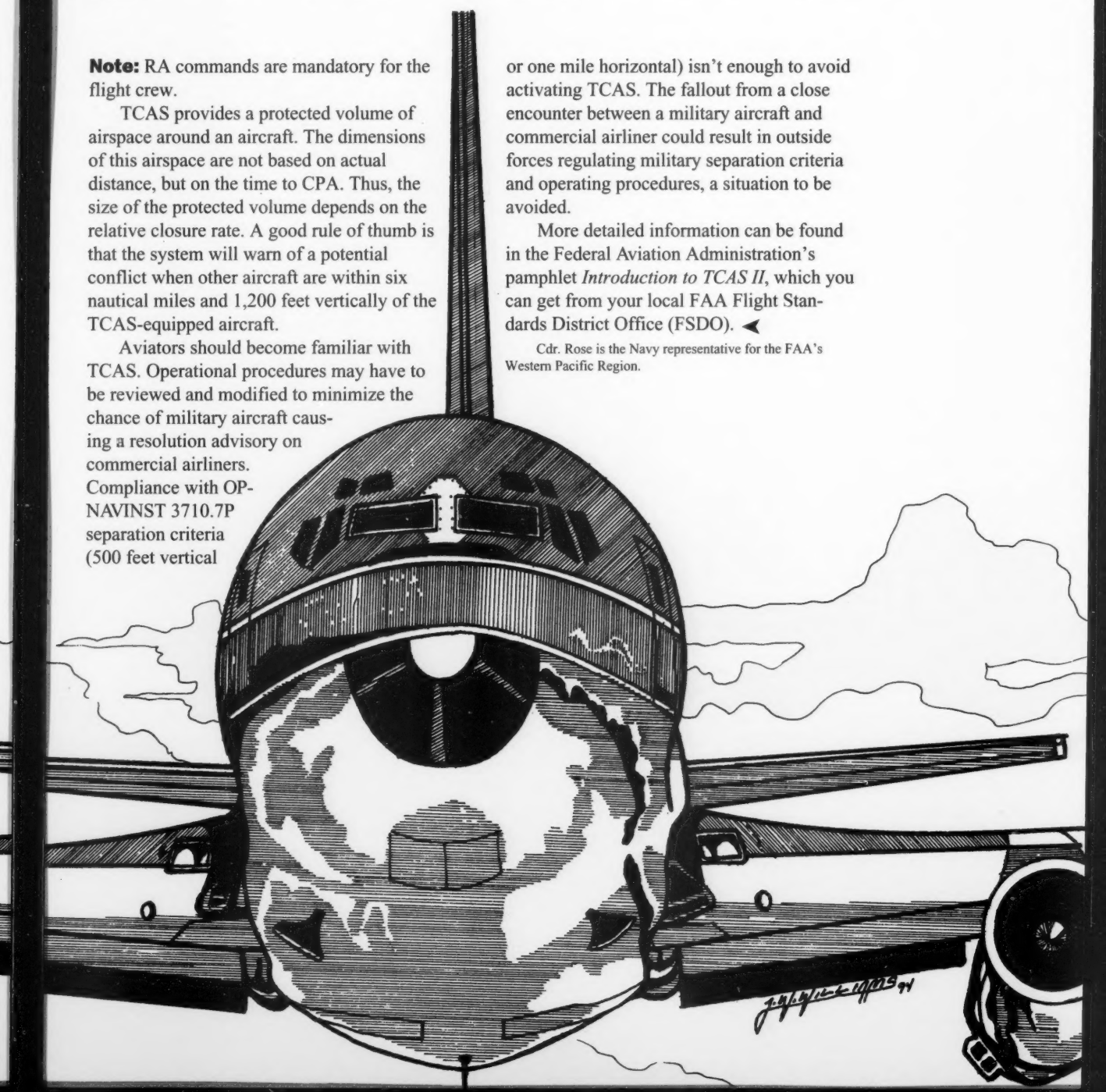
Note: RA commands are mandatory for the flight crew.

TCAS provides a protected volume of airspace around an aircraft. The dimensions of this airspace are not based on actual distance, but on the time to CPA. Thus, the size of the protected volume depends on the relative closure rate. A good rule of thumb is that the system will warn of a potential conflict when other aircraft are within six nautical miles and 1,200 feet vertically of the TCAS-equipped aircraft.

Aviators should become familiar with TCAS. Operational procedures may have to be reviewed and modified to minimize the chance of military aircraft causing a resolution advisory on commercial airliners. Compliance with OPNAVINST 3710.7P separation criteria (500 feet vertical or one mile horizontal) isn't enough to avoid activating TCAS. The fallout from a close encounter between a military aircraft and commercial airliner could result in outside forces regulating military separation criteria and operating procedures, a situation to be avoided.

More detailed information can be found in the Federal Aviation Administration's pamphlet *Introduction to TCAS II*, which you can get from your local FAA Flight Standards District Office (FSDO). ◄

Cdr. Rose is the Navy representative for the FAA's Western Pacific Region.



Pin

By Lt. Erik J. Miles

Our anxiously awaited "extra-training" flight to Texas finally arrived. Weeks in the planning, we had a place to stay, a rental car reserved, and the gouge on what to do and where to do it. About the only thing we didn't cover was the flight that would get us there. It was a standard airnav flight on a clear summer day, and I was flying with an experienced pilot with whom I had shared many hours in the cockpit.

I was six months into my fleet squadron tour as an S-3B NFO and getting saltier by the minute. Our crew also included a first-tour pilot and a new NFO in the back seat.

We filed a stopover flight plan to drop off the back-seat pilot before continuing on to our destination. On a previous cross-country, our destination field had closed while we were en route, making it necessary to divert. We were well aware of our strict time constraints and were determined to get there. The aircraft was loaded, but because of maintenance considerations, our departure was delayed for what was initially expected to be an hour. Our timeline allowed for such unexpected delays and we were not too concerned.

The hour delay was extended, and we nervously calculated our "drop-dead" time, which was the absolute latest time that we could take off as filed and make it to our destination before it closed. We still had an hour to go.

We finally got the good word from maintenance control that the aircraft was fixed, and we were airborne shortly after our final launch time. No problem. We would just have to do a quicker turnaround at the stopover field. Besides, the time we calculated was based on worst-case data.

Still slightly behind schedule, we landed at our stopover field and quickly taxied to the transient line to drop off the passenger and refuel.

After shutdown, we ran into several fueling delays, which extended the turnaround. Aggravated, I stood on the tarmac looking at my watch still thinking we could make it. We wouldn't make up lost time on the stopover but we could do that in the air. Besides, the winds would probably be more favorable than the Metro forecasters predicted and we could probably get an INS-direct clearance to shorten the trip.

We were finally gassed up and ready to go. To save time, we split the preflight between the frontseaters, with me taking one side and the pilot the other. We started up, got our clearance and were quickly cleared for takeoff. Part of the taxiway was closed because of maintenance, so we took the runway and back-taxied from an intersecting taxiway located about 2,000 feet from the approach end.

We were soon airborne, but after the pilot raised the gear handle, we saw that the nosewheel indicated down-and-locked while the main mounts showed up-and-locked. We both immediately realized that the nose-gear pin was still in. After a short pause, we asked each other, "Did you pull it prior to takeoff?" We knew full well what the answer was.

I jumped on the radios and told Tower that we would be turning downwind for landing to investigate a "minor problem" at the runway hold-short area and would quickly depart again.

We landed and back-taxied to the hold-short area, where we shut down the starboard engine to let the backseater out to pull the pin.

Trying to minimize our embarrassment, I said, "Open a few panels and act like you're looking at something before you pull the pin."

He did as instructed and strapped in while we restarted the engine and got our takeoff clearance. We took the runway and were off again.

At about 80 knots, Tower told us to abort the takeoff. No reason was given for the abort and we complied. After we asked what the problem was, Tower said that our clearance had fallen out of the system because we came around and landed. We

Heads

Lt. Erik J. Miles

politely recommended that in the future they handle a problem of that nature after the aircraft gets airborne instead of calling for a high-speed abort.

Frustrated, we back-taxied once again to the hold-short area, stopped and set the parking brake to await our clearance. It was now even further past our drop-dead time, but we still decided to continue on. We got our clearance once again and started to take the runway, but when the pilot released the parking brake, we felt the brakes binding. He applied more power to taxi into position, and as we started moving, we felt the bumping of the deflated tire underneath us. Tower told us to stop when they saw smoke coming from the tire, and quickly dispatched a crash crew.

We had landed using less-than-moderate brakes, followed by a high-speed abort, which had caused the brakes to overheat. When we set the parking brake, it melted the tire.

This cross-country was over. We shut down and exited the aircraft to help the crash crew. Our concern now was to get the aircraft safely off the only runway at the field so other aircraft could land.

After a short time, the brakes cooled sufficiently to allow the use of a tow dolly, but the Air Force base did not have the proper equipment to handle our Navy jet. The crash crew got to work and after about an hour, they finished building a makeshift wooden adapter to get our wheel onto the dolly. The crash crew was pressed to get us off the runway because Tower had told them that there were 10 C-141 aircraft orbiting overhead waiting to land.

Our S-3 was finally moving off the runway, but just as I started feeling like it was finally over, one of the wheels on the tow dolly started to smoke. In a matter of minutes it broke, and the dolly dug into the pavement bringing the aircraft to a stop once again.

I watched helplessly as the situation deteriorated further. The crash crew scrambled to find another tow dolly. Tower then decided to land the C-141s over our aircraft and onto the remaining 8,500 feet of runway rather than divert them on a Friday afternoon.

The huge jets roared overhead seemingly inches above our crippled Hoover. I facetiously contemplated folding the fin to get more vertical clearance. After several approaches, a few waveoffs, and many high energy stops, all the C-141s were on deck.

Act 2 of the tow-dolly scenario was played out, and our plane was finally moved off the runway about two-and-a-half hours after the whole ordeal started. I let the pilot make the embarrassing call home to explain why we were stuck and make arrangements for the rescue aircraft.

The primary cause of this incident was simple: in our haste we overlooked a basic preflight item. Normal procedures call for the front rightseater to check for three gear pins after the plane captain pulls them. Starting the aircraft at the stopover field without a plane captain took us out of our normal routine and we overlooked the simple procedure of verifying that all pins were pulled.

Stick with your preflight plan. Chances are the numbers you came up with in your preflight planning were pretty good. If you calculate a drop-dead takeoff time, stick to it. As late as we were, I'm not sure we would have made our destination even without our misfortunes at the stopover.

Thankfully, there was no greater damage done than a blown tire and a few bruised egos. The major inconvenience we caused to the crash crew, tower personnel, maintenance personnel and many landing aircraft could easily have been avoided.

By the way, the new guy in the back seat was really impressed with the way we do business in "the fleet". ◀

Lt. Miles flies with VS-35.

Letters

Approach welcomes letters from its readers. All letters should be signed though names will be withheld on request. Address: *Approach* Editor, Naval Safety Center, 375 A Street, Norfolk, VA 23511-4399. Views expressed are those of the writers and do not imply endorsement by the Naval Safety Center.

Re: "DR Nav: Knock the Rust Off" (Jul '94)

NAS Pt. Mugu—I take issue with the author's inference that VP NFOs don't "practice" DR Nav enough. Transition to DR Nav from a NACOMMs regular navigation procedures should be seamless if the nav is doing everything required of him. The incident LCdr. Goss describes indicates deficiencies in both NAVCOMMs and the TACCO's navigation abilities.

This story should have focused on why this crew found itself in this situation. Why didn't they use the computer position, why did they ignore the Omega, and was the aircraft equipped with GPS? Why didn't the NAVCOMM preflight the sextant, and why didn't he keep a K-factor log?

All of these elements could have prevented the embarrassing situation that developed. Evidently, the NAVCOMM had two working inertials for part of the flight, and one functioning inertial for all but the last 450 miles. A properly trained navigator would have had a very accurate position and precise equipment performance data to navigate the remaining leg into Keflavik.

Every five years, the VP community has an incident like this one that usually results in a wing-mandated increased workload for the NAVCOMM. Publishing a story like this, which infers that all VP NFOs are poorly trained, is a disservice to the hundreds of competent P-3 NFOs.

I think that the safety lessons to be learned from this article are that squadrons should identify weak performers and either get their performance up to speed, or ground them.

LCdr. Randal Farley
VP-65

Whoa! You're forgetting two of the primary purposes of all Approach *stories, whatever their community: to generate discussion and to promote safety through that discussion. Neither the author nor we were pointing at P-3 NFOs as examples of untrained, poorly performing aviators. Far from it. We appreciate your loyalty to your peers, but remember, the author wrote this story. If you look at the table-of-contents page, you'll see the little comment that says,* "Approach *contents should not be considered directive and may not be construed as incriminating...Views expressed in guest-written articles are not necessarily those of the Naval Safety Center..."—Ed.*

Re: "Tales From the Dark Side" (Aug '94)

NAS Whidbey Island—None of the accounts in the article are new experiences. I have heard them all in the FRS, most of them—if not all—from different people than those who participated in the ready-room survey. I would not have to look far to find them repeatedly. I've had a few of them, myself.

Does this mean that aviators will make certain mistakes no matter how many times advice to the contrary is passed down? Probably. Does it mean that passing on lessons learned is pointless? Of course not. That's the whole point behind NATOPS and publications like *Approach*.

When I read this story, the thought struck me that the reason these things happen again but to different people is that old aviator nemesis, the feeling of "It can't happen to me."

I don't subscribe to the theory that technology or FNAEB boards can eliminate mistakes. Instead of reacting to horror stories with ridicule or pity, I try noting the events that led up to the mishap and make sure that I don't make the same errors. Like most things, however, that's easier said than done, but we started learning these things in kindergarten.

Lt. B.W. Amsbury
VA-52

Re: "My Submarine Seasprite Ride" (Aug '94)

NAS South Weymouth—I have always enjoyed *Approach*. It helps ensure safe operations in our Navy. I did notice a discrepancy in this article in emergency egress procedures as described by the author.

He writes about exiting a submerged airframe with his HEED bottle in his mouth at an undetermined depth. He relates how, as he rose toward the surface, he let the bottle fall from his mouth." It would appear that he had been breathing compressed air from the HEED bottle at considerable depth. The procedure he describes actually increases the risk of air embolism.

If you actuate a HEED bottle at depth during egress, the proper procedure is to continue slow, gentle breathing off the bottle all the way to the surface. Air in the lungs expands as you rise, but continuous breathing allows equalization of pressure and air volume in the lungs to normal levels.

If a volume of compressed air is held in the lungs as you ascend, the air expands, overdistends the lungs, and may rupture the air sacs to allow air to get into the blood-stream, resulting in an air embolism. Lt. Reed was indeed fortunate on many counts the day of his mishap.

If you exhaust the HEED air supply while you are still submerged, you should let the bottle fall away from your mouth, turn your face toward the surface, open your mouth and expel air from your lungs (repeating the phrase, "Ho-ho-ho," continuously) until reaching the surface. This venting of air prevents the expanding lung air volume from damaging the lungs. Adequate oxygen is nearly always available to permit a safe ascent despite constant exhalation.

A good, non-technical description of the physiology involved is in the U.S. Navy Diving Manual (NAVSEA 0994-LP-001-9010).

LCdr. Gerard B. Hayes, MC
Flight Surgeon, VP-92

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Thx Kxy

Xvxn though our typxwritxr is an old modxl it works quitx wxll xxcxpt for onx of thx kxys. It is trux that thxrx arx forty kxys that function wxll xnough, but just onx kxy not working makxs all thx diffxrxncx.

Somxtimxs it sxxms our naval aviation txam is rathxr likx this typxwritxr – not all thx kxy pxoplx arx working propxrly.

You may say to yoursxlf, "Wxll, I am only onx pxrson, I won't makx or brxak it," but it doxs makx a diffxrxncx bxcausx a txam rxquirxs thx participation of xvxry pxrson to bx xffxctivx.

So thx nxxt timx you think you arx only onx pxrson and that your xfforts arx not nxxdxd, rxmxmbxr our typxwritxr.

RAAF Flight Safxty Rxvixw